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| plot.default {graphics} | R Documentation |

The Default Scatterplot Function

**Description**

Draw a scatter plot with decorations such as axes and titles in the active graphics window.

**Usage**

## Default S3 method:

plot(x, y = NULL, type = "p", xlim = NULL, ylim = NULL,

log = "", main = NULL, sub = NULL, xlab = NULL, ylab = NULL,

ann = par("ann"), axes = TRUE, frame.plot = axes,

panel.first = NULL, panel.last = NULL, asp = NA, ...)

**Arguments**

|  |  |
| --- | --- |
| x, y | the x and y arguments provide the x and y coordinates for the plot. Any reasonable way of defining the coordinates is acceptable. See the function[xy.coords](http://127.0.0.1:33641/help/library/graphics/help/xy.coords) for details. If supplied separately, they must be of the same length. |
| type | 1. character string giving the type of plot desired. The following values are possible, for details, see [plot](http://127.0.0.1:33641/help/library/graphics/help/plot): "p" for points, "l" for lines, "b" for both points and lines, "c" for empty points joined by lines, "o" for overplotted points and lines, "s" and "S" for stair steps and "h" for histogram-like vertical lines. Finally, "n" does not produce any points or lines.   type  what type of plot should be drawn. Possible types are   1. "p" for **p**oints, 2. "l" for **l**ines, 3. "b" for **b**oth, 4. "c" for the lines part alone of "b", 5. "o" for both ‘**o**verplotted’, 6. "h" for ‘**h**istogram’ like (or ‘high-density’) vertical lines, 7. "s" for stair **s**teps, 8. "S" for other **s**teps, see ‘Details’ below, 9. "n" for no plotting. |
| xlim | the x limits (x1, x2) of the plot. Note that x1 > x2 is allowed and leads to a ‘reversed axis’.  The default value, NULL, indicates that the range of the [finite](http://127.0.0.1:33641/help/library/graphics/help/finite) values to be plotted should be used. |
| ylim | the y limits of the plot. |
| log | a character string which contains "x" if the x axis is to be logarithmic, "y"if the y axis is to be logarithmic and "xy" or "yx" if both axes are to be logarithmic. |
| main | a main title for the plot, see also [title](http://127.0.0.1:33641/help/library/graphics/help/title). |
| sub | a sub title for the plot. |
| xlab | a label for the x axis, defaults to a description of x. |
| ylab | a label for the y axis, defaults to a description of y.  [**R语言-坐标轴画法要旨**](http://blog.csdn.net/hongweigg/article/details/47983423)  [作者同类文章](http://blog.csdn.net/hongweigg/article/category/3135735)X  在R语言中绘制坐标轴时，如何将坐标轴的刻度画在图内呢？  下面有一个完整的例子：  #画图测试aixs.test<-function(){    x<-rnorm(7)    #print(x)    y<-round(c(1:5)\*(max(x)-min(x))/5+min(x),digits=2)    xx<-round(c(1:5)\*length(x)/5,digits=2)    #print(y)    opar<-par(no.readonly=TRUE)    par(mar=c(5,4,4,8)+0.1)    plot(x, type="b", pch=21, col="red", xaxt="n",yaxt="n", lty=3, ann=FALSE)    axis(1, at=xx, labels=xx, col.axis="black", las=0, tck=0.03)    axis(2, at=y, labels=y, col.axis="black", las=2, tck=0.03)    title("An Example of Creative Axes", xlab="X values", ylab="Y values")    par(opar)}aixs.test();  这里说明如下：  （1）x为要绘制的数据，这里为一正态分布函数产生。  （2）y 为绘制y轴分刻度用，主要是将绘图区均匀分为5个刻度。  （3）xx为绘制xx轴的刻度，也是设置绘制5个均匀刻度。  （4）xaxt="n"，yaxt="n"表示不绘制x轴或y轴。  **（5）las表示坐标轴标签平行于坐标轴还是垂直于坐标轴，0-平行；2-垂直**  **（6）tck坐标轴刻度长度，正数为在图内侧画，负数为在外侧画。**  （7）axis()为绘制坐标轴的函数。  （8）title()用来设置设置标题，y轴和x轴的标签。xlab,ylab分别为x,y轴标签。  （9）par()用来修改图形参数：  par(mar=c(5,4,4,8)+0.1)  生效后直至会话结束，为了防止图形设置对其他绘图的影响，先使用opar变量保存该设置，在运行结束后恢复       opar<-par(no.readonly=TRUE)      par(opar)  （10）ann参数表示高级绘图函数已经包含的默认的标题和标签，可以用ann=FALSE取消默认的标题和标签。  最终效果为：  *http://img.blog.csdn.net/20150825211633528?watermark/2/text/aHR0cDovL2Jsb2cuY3Nkbi5uZXQv/font/5a6L5L2T/fontsize/400/fill/I0JBQkFCMA==/dissolve/70/gravity/Center* |
| ann | a logical value indicating whether the default annotation (title and x and y axis labels) should appear on the plot.   |  |  | | --- | --- | | axis {graphics} | R Documentation |  Add an Axis to a PlotDescription Adds an axis to the current plot, allowing the specification of the side, position, labels, and other options. Usage axis(side, at = NULL, labels = TRUE, tick = TRUE, line = NA,  pos = NA, outer = FALSE, font = NA, lty = "solid",  lwd = 1, lwd.ticks = lwd, col = NULL, col.ticks = NULL,  hadj = NA, padj = NA, ...) Arguments  |  |  | | --- | --- | | side | an integer specifying which side of the plot the axis is to be drawn on. The axis is placed as follows: 1=below, 2=left, 3=above and 4=right. | | at | the points at which tick-marks are to be drawn. Non-finite (infinite, NaN or NA) values are omitted. By default (when NULL) tickmark locations are computed, see ‘Details’ below. | | labels | this can either be a logical value specifying whether (numerical) annotations are to be made at the tickmarks, or a character or expression vector of labels to be placed at the tickpoints. (Other objects are coerced by[as.graphicsAnnot](http://127.0.0.1:33641/help/library/graphics/help/as.graphicsAnnot).) If this is not logical, at should also be supplied and of the same length. If labels is of length zero after coercion, it has the same effect as supplying TRUE. | | tick | a logical value specifying whether tickmarks and an axis line should be drawn. | | line | the number of lines into the margin at which the axis line will be drawn, if not NA. | | pos | the coordinate at which the axis line is to be drawn: if not NA this overrides the value of line. | | outer | a logical value indicating whether the axis should be drawn in the outer plot margin, rather than the standard plot margin. | | font | font for text. Defaults to par("font"). | | lty | line type for both the axis line and the tick marks. | | lwd, lwd.ticks | line widths for the axis line and the tick marks. Zero or negative values will suppress the line or ticks. | | col, col.ticks | colors for the axis line and the tick marks respectively. col = NULL means to use par("fg"), possibly specified inline, and col.ticks = NULLmeans to use whatever color col resolved to. | | hadj | adjustment (see [par](http://127.0.0.1:33641/help/library/graphics/help/par)("adj")) for all labels parallel (‘horizontal’) to the reading direction. If this is not a finite value, the default is used (centring for strings parallel to the axis, justification of the end nearest the axis otherwise). | | padj | adjustment for each tick label perpendicular to the reading direction. For labels parallel to the axes, padj = 0 means right or top alignment, andpadj = 1 means left or bottom alignment. This can be a vector given a value for each string, and will be recycled as necessary.  If padj is not a finite value (the default), the value of par("las") determines the adjustment. For strings plotted perpendicular to the axis the default is to centre the string. | | ... | other [graphical parameters](http://127.0.0.1:33641/help/library/graphics/help/graphical%20parameters) may also be passed as arguments to this function, particularly, cex.axis, col.axis and font.axis for axis annotation, mgp and xaxp or yaxp for positioning, tck or tcl for tick mark length and direction, las for vertical/horizontal label orientation, or fg instead of col, and xpd for clipping. See [par](http://127.0.0.1:33641/help/library/graphics/help/par) on these.  Parameters xaxt (sides 1 and 3) and yaxt (sides 2 and 4) control if the axis is plotted at all.  Note that lab will partial match to argument labels unless the latter is also supplied. (Since the default axes have already been set up by [plot.window](http://127.0.0.1:33641/help/library/graphics/help/plot.window), lab will not be acted on by axis.) |  Details The axis line is drawn from the lowest to the highest value of at, but will be clipped at the plot region. By default, only ticks which are drawn from points within the plot region (up to a tolerance for rounding error) are plotted, but the ticks and their labels may well extend outside the plot region. Use xpd = TRUE or xpd = NA to allow axes to extend further.  When at = NULL, pretty tick mark locations are computed internally (the same way[axTicks](http://127.0.0.1:33641/help/library/graphics/help/axTicks)(side) would) from [par](http://127.0.0.1:33641/help/library/graphics/help/par)("xaxp") or "yaxp" and [par](http://127.0.0.1:33641/help/library/graphics/help/par)("xlog") (or "ylog"). Note that these locations may change if an on-screen plot is resized (for example, if theplot argument asp (see [plot.window](http://127.0.0.1:33641/help/library/graphics/help/plot.window)) is set.)  If labels is not specified, the numeric values supplied or calculated for at are converted to character strings as if they were a numeric vector printed by [print.default](http://127.0.0.1:33641/help/library/graphics/help/print.default)(digits = 7).  The code tries hard not to draw overlapping tick labels, and so will omit labels where they would abut or overlap previously drawn labels. This can result in, for example, every other tick being labelled. (The ticks are drawn left to right or bottom to top, and space at least the size of an ‘m’ is left between labels.)  If either line or pos is set, they (rather than par("mgp")[3]) determine the position of the axis line and tick marks, and the tick labels are placed par("mgp")[2] further lines into (or towards for pos) the margin.  Several of the graphics parameters affect the way axes are drawn. The vertical (for sides 1 and 3) positions of the axis and the tick labels are controlled by mgp[2:3] and mex, the size and direction of the ticks is controlled by tck and tcl and the appearance of the tick labels by cex.axis, col.axis and font.axis with orientation controlled by las (but not srt, unlike S which uses srt if at is supplied and las if it is not). Note that adj is not supported and labels are always centered. See [par](http://127.0.0.1:33641/help/library/graphics/help/par) for details. Value The numeric locations on the axis scale at which tick marks were drawn when the plot was first drawn (see ‘Details’).  This function is usually invoked for its side effect, which is to add an axis to an already existing plot. References Becker, R. A., Chambers, J. M. and Wilks, A. R. (1988) The New S Language. Wadsworth & Brooks/Cole. See Also [Axis](http://127.0.0.1:33641/help/library/graphics/help/Axis) for a generic interface.  [axTicks](http://127.0.0.1:33641/help/library/graphics/help/axTicks) returns the axis tick locations corresponding to at = NULL; [pretty](http://127.0.0.1:33641/help/library/graphics/help/pretty) is more flexible for computing pretty tick coordinates and does not depend on (nor adapt to) the coordinate system in use.  Several graphics parameters affecting the appearance are documented in [par](http://127.0.0.1:33641/help/library/graphics/help/par). Examples require(stats) # for rnorm  plot(1:4, rnorm(4), axes = FALSE)  axis(1, 1:4, LETTERS[1:4])  axis(2)  box() #- to make it look "as usual"  plot(1:7, rnorm(7), main = "axis() examples",  type = "s", xaxt = "n", frame = FALSE, col = "red")  axis(1, 1:7, LETTERS[1:7], col.axis = "blue")  # unusual options:  axis(4, col = "violet", col.axis = "dark violet", lwd = 2)  axis(3, col = "gold", lty = 2, lwd = 0.5)  # one way to have a custom x axis  plot(1:10, xaxt = "n")  axis(1, xaxp = c(2, 9, 7))  [Package graphics version 3.3.0 [Index](http://127.0.0.1:33641/help/library/graphics/html/00Index.html)] |
| axes | a logical value indicating whether both axes should be drawn on the plot. Use [graphical parameter](http://127.0.0.1:33641/help/library/graphics/help/graphical%20parameter) "xaxt" or "yaxt" to suppress just one of the axes. |
| frame.plot | a logical indicating whether a box should be drawn around the plot. |
| panel.first | an ‘expression’ to be evaluated after the plot axes are set up but before any plotting takes place. This can be useful for drawing background grids or scatterplot smooths. Note that this works by lazy evaluation: passing this argument from other plot methods may well not work since it may be evaluated too early. |
| panel.last | an expression to be evaluated after plotting has taken place but before the axes, title and box are added. See the comments about panel.first.  col  A specification for the default plotting color. See section ‘Color Specification’.  Some functions such as [lines](http://127.0.0.1:33641/help/library/graphics/help/lines) and [text](http://127.0.0.1:33641/help/library/graphics/help/text) accept a vector of values which are recycled and may be interpreted slightly differently.  col.axis  The color to be used for axis annotation. Defaults to "black".  col.lab  The color to be used for x and y labels. Defaults to "black".  col.main  The color to be used for plot main titles. Defaults to "black".  col.sub  The color to be used for plot sub-titles. Defaults to "black". |
| asp | the *y/x* aspect ratio, see [plot.window](http://127.0.0.1:33641/help/library/graphics/help/plot.window). |
| ... | other [graphical parameters](http://127.0.0.1:33641/help/library/graphics/help/graphical%20parameters) (see [par](http://127.0.0.1:33641/help/library/graphics/help/par) and section ‘Details’ below).  font  An integer which specifies which font to use for text. If possible, device drivers arrange so that 1 corresponds to plain text (the default), 2 to bold face, 3 to italic and 4 to bold italic. Also, font 5 is expected to be the symbol font, in Adobe symbol encoding. On some devices font families can be selected by family to choose different sets of 5 fonts.  font.axis  The font to be used for axis annotation.  font.lab  The font to be used for x and y labels.  font.main  The font to be used for plot main titles.  font.sub  The font to be used for plot sub-titles. |

**Details**

Commonly used [graphical parameters](http://127.0.0.1:33641/help/library/graphics/help/graphical%20parameters) are:

col

The colors for lines and points. Multiple colors can be specified so that each point can be given its own color. If there are fewer colors than points they are recycled in the standard fashion. Lines will all be plotted in the first colour specified.

bg

a vector of background colors for open plot symbols, see [points](http://127.0.0.1:33641/help/library/graphics/help/points). Note: this is **not**the same setting as [par](http://127.0.0.1:33641/help/library/graphics/help/par)("bg").

pch

a vector of plotting characters or symbols: see [points](http://127.0.0.1:33641/help/library/graphics/help/points).

Values of pch are stored internally as integers. The interpretation is

* NA\_integer\_: no symbol.
* 0:18: S-compatible vector symbols.
* 19:25: further **R** vector symbols.
* 26:31: unused (and ignored).
* 32:127: ASCII characters.
* 128:255 native characters *only in a single-byte locale and for the symbol font*. (128:159 are only used on Windows.)
* -32 ... Unicode code point (where supported).

Note that unlike S (which uses octagons), symbols 1, 10, 13 and 16 use circles. The filled shapes 15:18 do not include a border.



The following **R** plotting symbols are can be obtained with pch = 19:25: those with 21:25can be colored and filled with different colors: col gives the border color and bg the background color (which is "grey" in the figure)

* pch = 19: solid circle,
* pch = 20: bullet (smaller solid circle, 2/3 the size of 19),
* pch = 21: filled circle,
* pch = 22: filled square,
* pch = 23: filled diamond,
* pch = 24: filled triangle point-up,
* pch = 25: filled triangle point down.

cex

a numerical vector giving the amount by which plotting characters and symbols should be scaled relative to the default. This works as a multiple of [par](http://127.0.0.1:33641/help/library/graphics/help/par)("cex"). NULL andNA are equivalent to 1.0. Note that this does not affect annotation: see below.

cex。用于表示对默认的绘图文本和符号放大多少倍。需要注意一些绘图函数如plot.default等也有一个相同名字的参数，但是此时表示在函数par()的参数cex的基础上再放大多少倍，此外还有函数points等接受一个数值向量为参数。

* cex.axis。表示在当前的cex设定情况下，对坐标轴刻度值字体的放大倍数。
* cex.lab。表示在当前的cex设定情况下，对坐标轴名称字体的放大倍数。
* cex.main。表示在当前的cex设定情况下，对主标题字体的放大倍数。
* cex.sub。表示在当前的cex设定情况下，对子标题字体的放大倍数。

lty

a vector of line types, see [par](http://127.0.0.1:33641/help/library/graphics/help/par).

cex.main, col.lab, font.sub, etc

settings for main- and sub-title and axis annotation, see [title](http://127.0.0.1:33641/help/library/graphics/help/title) and [par](http://127.0.0.1:33641/help/library/graphics/help/par).

lwd

a vector of line widths, see [par](http://127.0.0.1:33641/help/library/graphics/help/par).

**Note**

The presence of panel.first and panel.last is a historical anomaly: default plots do not have ‘panels’, unlike e.g. [pairs](http://127.0.0.1:33641/help/library/graphics/help/pairs) plots. For more control, use lower-level plotting functions: plot.default calls in turn some of [plot.new](http://127.0.0.1:33641/help/library/graphics/help/plot.new), [plot.window](http://127.0.0.1:33641/help/library/graphics/help/plot.window), [plot.xy](http://127.0.0.1:33641/help/library/graphics/help/plot.xy),[axis](http://127.0.0.1:33641/help/library/graphics/help/axis), [box](http://127.0.0.1:33641/help/library/graphics/help/box) and [title](http://127.0.0.1:33641/help/library/graphics/help/title), and plots can be built up by calling these individually, or by callingplot(type = "n") and adding further elements.

**References**

Becker, R. A., Chambers, J. M. and Wilks, A. R. (1988) *The New S Language*. Wadsworth & Brooks/Cole.

Cleveland, W. S. (1985) *The Elements of Graphing Data.* Monterey, CA: Wadsworth.

Murrell, P. (2005) *R Graphics*. Chapman & Hall/CRC Press.

**See Also**

[plot](http://127.0.0.1:33641/help/library/graphics/help/plot), [plot.window](http://127.0.0.1:33641/help/library/graphics/help/plot.window), [xy.coords](http://127.0.0.1:33641/help/library/graphics/help/xy.coords). For thousands of points, consider using[smoothScatter](http://127.0.0.1:33641/help/library/graphics/help/smoothScatter) instead.

**Examples**

Speed <- cars$speed

Distance <- cars$dist

plot(Speed, Distance, panel.first = grid(8, 8),

pch = 0, cex = 1.2, col = "blue")

plot(Speed, Distance,

panel.first = lines(stats::lowess(Speed, Distance), lty = "dashed"),

pch = 0, cex = 1.2, col = "blue")

## Show the different plot types

x <- 0:12

y <- sin(pi/5 \* x)

op <- par(mfrow = c(3,3), mar = .1+ c(2,2,3,1))

for (tp in c("p","l","b", "c","o","h", "s","S","n")) {

plot(y ~ x, type = tp, main = paste0("plot(\*, type = \"", tp, "\")"))

if(tp == "S") {

lines(x, y, type = "s", col = "red", lty = 2)

mtext("lines(\*, type = \"s\", ...)", col = "red", cex = 0.8)

}

}

par(op)

##--- Log-Log Plot with custom axes

lx <- seq(1, 5, length = 41)

yl <- expression(e^{-frac(1,2) \* {log[10](x)}^2})

y <- exp(-.5\*lx^2)

op <- par(mfrow = c(2,1), mar = par("mar")+c(0,1,0,0))

plot(10^lx, y, log = "xy", type = "l", col = "purple",

main = "Log-Log plot", ylab = yl, xlab = "x")

plot(10^lx, y, log = "xy", type = "o", pch = ".", col = "forestgreen",

main = "Log-Log plot with custom axes", ylab = yl, xlab = "x",

axes = FALSE, frame.plot = TRUE)

my.at <- 10^(1:5)

axis(1, at = my.at, labels = formatC(my.at, format = "fg"))

at.y <- 10^(-5:-1)

axis(2, at = at.y, labels = formatC(at.y, format = "fg"), col.axis = "red")

par(op)

[Package *graphics* version 3.3.0 [Index](http://127.0.0.1:33641/help/library/graphics/html/00Index.html)]